

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
28 June 2001 (28.06.2001)

PCT

(10) International Publication Number
WO 01/47044 A3

(51) International Patent Classification⁷: **H01L 51/40,**
21/311

(21) International Application Number: **PCT/GB00/04940**

(22) International Filing Date:
21 December 2000 (21.12.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
9930217.6 21 December 1999 (21.12.1999) GB
0009917.6 20 April 2000 (20.04.2000) GB

(71) Applicant (for all designated States except US): **PLAS-
TIC LOGIC LIMITED** [GB/GB]; Sheraton House, Cas-
tle Park, Cambridge CB3 0AX (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SIRRINGHAUS,**
Henning [DE/GB]; Churchill College, Cambridge CB3
0DS (GB). **FRIEND, Richard, Henry** [GB/GB]; 37 Bar-
ton Road, Cambridge CB3 9LG (GB). **KAWASE, Takeo**
[JP/GB]; 18 Eachard Road, Cambridge CB3 6HY (GB).

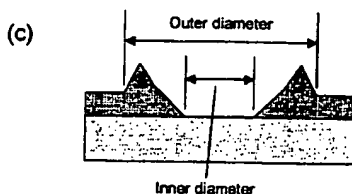
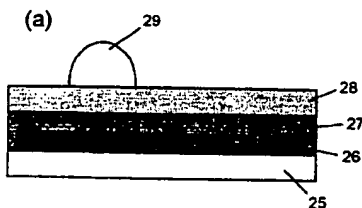
(74) Agents: **SLINGSBY, Philip, Roy et al.**; Page White &
Farrer, 54 Doughty Street, London WC1N 2LS (GB).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ,
DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,
TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

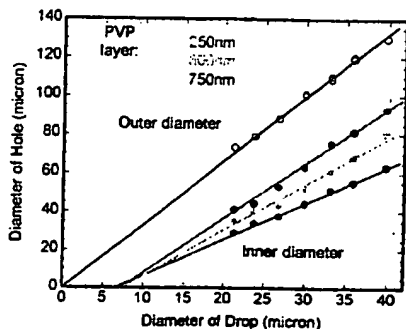
(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian

[Continued on next page]

(54) Title: **FORMING INTERCONNECTS**



(57) Abstract: A method for forming an electronic device, comprising:
forming a first conductive or semiconductive layer; forming a sequence
of at least one insulating layer and at least one semiconducting layer over
the first conductive or semiconductive layer; locally depositing solvents
at a localised region of the insulating layer so as to dissolve the sequence
of insulating and semiconducting layers in the region to leave a void
extending through the sequence of layers; and depositing conductive or
semiconductive material in the void.



BEST AVAILABLE COPY

WO 01/47044 A3



patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:
6 December 2001

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PC1/GB 00/04940

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L51/40 H01L21/311

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

INSPEC, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 10939 A (KONINKL PHILIPS ELECTRONICS NV ;PHILIPS AB (SE)) 4 March 1999 (1999-03-04) the whole document	44-48
X	WO 99 12398 A (CAMBRIDGE DISPLAY TECH ;FRIEND RICHARD HENRY (GB)) 11 March 1999 (1999-03-11) the whole document	44-48
X	EP 0 933 814 A (IMEC INTER UNI MICRO ELECTR) 4 August 1999 (1999-08-04) the whole document	49
A	US 4 140 572 A (STEIN LEONARD) 20 February 1979 (1979-02-20) the whole document	1,4
-/-		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

19 February 2001

Date of mailing of the international search report

18.05.01

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3018

Authorized officer

Königstein, C

INTERNATIONAL SEARCH REPORT

International Application No

PC1/GB 00/04940

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 923 112 A (CLARIANT INT LTD) 16 June 1999 (1999-06-16) the whole document	1,4

A	EP 0 930 641 A (SEIKO EPSON CORP) 21 July 1999 (1999-07-21) the whole document	1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 00/04940

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-38, 44-49

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-38,44-49

Patterning of organic insulating layers by selective etching

The prior Art describes a field effect transistor substantially consisting of organic materials.

The new features mentioned in claims 1-38 are contact holes, made in organic dielectric layers by wet etching using an ink-jet printing system to locally supply the etch liquid.

From this we can formulate an objective problem of making contact holes in organic dielectric layers by wet etching using an ink-jet printing system to locally supply the etch liquid.

The special technical features, as defined in Rule 13(2) PCT, are contact holes, made in organic dielectric layers by wet etching using an ink-jet printing system to locally supply the etch liquid.

2. Claims: 39-43

Selective doping of organic insulating layers

The prior Art describes a field effect transistor substantially consisting of organic materials.

The new features mentioned in claims 1-38 are conductive (interconnection) patterns made by selective doping organic insulating layers to make them conductive. The dopants are applied using an ink-jet printing system.

From this we can formulate an objective problem of making conductive patterns made by selective doping organic insulating layers to make them conductive, applying the dopants are using an ink-jet printing system.

The special technical features, as defined in Rule 13(2) PCT, are conductive (interconnection) patterns made by selective doping organic insulating layers to make them conductive. The dopants are applied using an ink-jet printing system.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC1/GB 00/04940

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 9910939	A	04-03-1999	EP	0968537 A	05-01-2000
WO 9912398	A	11-03-1999	NONE		
EP 0933814	A	04-08-1999	EP	0933815 A	04-08-1999
			JP	11312682 A	09-11-1999
US 4140572	A	20-02-1979	DE	2739847 A	09-03-1978
			FR	2363887 A	31-03-1978
			GB	1534475 A	06-12-1978
			JP	1262920 C	16-05-1985
			JP	53044012 A	20-04-1978
			JP	59037495 B	10-09-1984
EP 0923112	A	16-06-1999	JP	11044960 A	16-02-1999
			CN	1229522 T	22-09-1999
			WO	9859363 A	30-12-1998
EP 0930641	A	21-07-1999	JP	11204529 A	30-07-1999
			TW	383280 B	01-03-2000